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The ISA accelerometer and Lunar science

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In recent years the Moon has become again a target for exploration activities, as shown by many missions, performed, ongoing or foreseen. The reasons for this new wave are manifold. The knowledge of formation and evolution of the Moon to its current state is important in order to trace the overall history of Solar System. An effective driving factor is the possibility of building a human settlement on its surface, with all the related issues of environment characterization, safety, resources, communication and navigation. Our natural satellite is also an important laboratory for fundamental physics: Lunar Laser Ranging is continuing to provide important data for testing gravitation theories. All these topics are providing stimulus and inspirations for new experiments: in fact a wide variety of them has been proposed to be conducted on the lunar surface.

ISA (Italian Spring Accelerometer) can provide an important tool for lunar studies. Thanks to its structure (three one-dimensional sensors assembled in a composite structure) it works both in-orbit and on-ground, with the same configuration. It can therefore be used onboard a spacecraft, as a support to a radio science mission, and on the surface of the Moon, as a seismometer. This second option in particular has been the subject of preliminary studies and has been proposed as a candidate to be hosted on NASA ILN (International Lunar Network) and ESA First Lunar Lander. ISA-S (ISA-Seismometer) has a very high sensitivity, which has already been demonstrated with long time periods of usage on Earth. After a description of the instrument, its use in the context of landing missions will be described and discussed, giving emphasis on its integration with the other components of the systems.